

WHAT IS CLAIMED IS:

1. A system for operating a GPS C/A code receiver comprising:  
means for forming x multibit digital segment values per C/A code period, each multibit digital segment value representing a sequential code segment of a received  
5 composite of satellite signals; and  
means for correlating each digital segment value with n satellite specific sets of m differently time delayed segments of C/A code modulation to form at least n times m time delay specific correlation values.
2. The system of claim 1 wherein m is greater than the number of bits in each multibit digital segment value.
3. The system of claim 1 wherein each bit of the multibit digital segment value represents an integer fraction of a C/A code chip.
4. The system of claim 1 wherein the correlating means comprises means for tracking different satellites by selecting the satellite specific sets to represent n different satellites.
5. The system of claim 1 wherein the correlating means comprises means for tracking different satellites by selecting more than one of the satellite specific sets to represent the same satellite.
6. The system of claim 5 wherein the time delay segments of the satellite specific sets representing the same satellite are sequential.
7. The system of claim 5 wherein the time delay segments of the satellite specific sets representing the same satellite are interlaced.
8. The system of claim 5 wherein the differential time delay of the segments of the satellite specific sets representing the same satellite represent less than a maximum expected time delay error for a temporarily obscured satellite in an urban environment.

9. The system of claim 1 wherein the correlating means comprises means for tracking different satellites by selecting the satellite specific sets to represent an integer fraction of  $n$  different satellites.

10. The system of claim 1 wherein the correlating means comprises means for tracking  $n/2$  satellites by selecting the satellite specific sets to represent  $n/2$  different satellites.

11. The system of claim 1 wherein the correlating means is adapted to:  
acquire a satellite by selecting the satellite specific sets to represent the same satellite; and  
repeat the correlation for the same satellite with a different set of time delayed  
5 segments.

12. The system of claim 1 wherein  $x$ ,  $m$  and  $n$  are each prime factors of the number of code chips per C/A code period.

13. The system of claim 1 further comprising means for forming the series of  $m/2$  differently time delayed segments by sequentially changing one bit of a previous segment to form the next segment.

14. The system of claim 1 wherein the forming means comprises:  
means for sampling the received composite at a first bit rate; and  
means for digitally filtering the first composite to form the digital segment values at a bit rate substantially lower than the first bit rate.

15. The system of claim 1 further comprising means for interrupting the correlating means for a series of code periods to reduce receiver energy consumption.

16. A system for tracking the movement of an object, said system comprising:  
a GPS C/A code receiver associated with the object and adapted to:

5        form  $x$  multibit digital segment values per C/A code period, each multibit digital segment value representing a sequential code segment of a received composite of satellite signals; and

      correlate each digital segment value with  $n$  satellite specific sets of  $m$  differently time delayed segments of C/A code modulation to form at least  $n$  times  $m$  time delay specific correlation values; and

      means for determining navigation information from the correlation values.

17.     The system of claim 16 wherein the determining means comprises means for comparing the magnitudes of two equal correlation values to the magnitude of a correlation value therebetween to select a prompt delay.

18.     The system of claim 17 wherein the comparing means comprises means for selecting the prompt delay to be more than half way between the time delays represented by the equal correlation values when the magnitude of the equal correlation products is equal to less than half of a peak correlation value therebetween.

19.     The system of claim 17 wherein the comparing means comprises means for selecting the prompt delay to be less than half way between the time delays represented by the equal correlation values when the magnitude of the equal correlation products is equal to more than half of a peak correlation value therebetween.

20.     A method of operating a GPS C/A code receiver comprising:

      forming  $x$  multibit digital segment values per C/A code period, each multibit digital segment value representing a sequential code segment of a received composite of satellite signals;

5        correlating each digital segment value with  $n$  satellite specific sets of  $m$  differently time delayed segments of C/A code modulation to form at least  $n$  times  $m$  time delay specific correlation values; and

      accumulating the correlation values in a  $n$  time  $m$  matrix.